CLAIMS

1. A non-contact charging system having a battery pack (B) charged by an induced electromotive force generated from a non-contact charger (A) supplied with power, wherein the non-contact charger (A) comprises: an electromagnetic wave filter (100) connected to a power input terminal to block electromagnetic waves caused by Alternating Current (AC) power; a primary rectification circuit (110) for rectifying the AC power, the electromagnetic waves of which are blocked, to Direct Current (DC) power; a flyback converter (110') for storing power transferred from the primary rectification circuit (110) while a contained transistor is turned on, and applying an input voltage to a gate driver (160), a central processing unit (180) and an ion generation unit (182) and applying a driving voltage to a series resonance type converter (120) when the contained transistor is turned off; a current detection unit (170) interposed between the flyback converter (110') and the series resonance type converter (120) to detect variation in current resulting from approach of the battery pack (B), and outputting a comparison current depending on variation in current; a central processing unit (180) for detecting the approach of the battery pack (B) using the comparison current input

from the current detection unit (170), controlling the gate drive (160) according not only to whether the battery pack (B) approaches but also to the current of a temperature protection circuit unit (183) to stop the switching of the gate drive (160) when abnormal operation occurs or the temperature of a foreign object placed on the non-contact charging pad exceeds a predetermined temperature; a gate driver (160) for outputting gate signals under the control of the central processing unit (180); the series resonance type converter (120) for adjusting the waveforms of voltage and current applied to a primary core unit (130) in response to the gate signals input from the gate driver (160); and the primary core unit (130) switched by the series resonance type converter (120) to generate the induced electromotive force.

2. The non-contact charging system according to claim 1, wherein the gate driver (160) allows two switching devices, which are provided in the series resonance type converter (120), to be alternately turned on in response to the gate signals output under control of the central processing unit (180), thus adjusting the waveforms of the input voltage and current through charging and discharging parallel capacitors coupled to respective switching devices.

3. The non-contact charging system according to claim 1, wherein the current detection unit (170) is connected to both ends of a resistor connected to an output terminal of the flyback converter (110') and an input terminal of the series resonance type converter (120), comprises a differential amplifier (171) to which signals output from both ends of the resistor are input, and a comparator/low frequency filter (172) which is coupled to an output terminal of the differential amplifier (171), and detects variation in current by comparing the output voltage of the differential amplifier (171) with a predetermined reference voltage, filters out a comparison current depending on variation in current, and outputs the comparison current.

4. The non-contact charging system according to claim 1, wherein the central processing unit (180) is configured to process information fed back from a dust and odor sensor (181) and switch an operation mode of the ion generation unit (182).

5. The non-contact charging system according to claim 1, wherein the primary core unit (130) is configured such that coils (Pcoil1 and Pcoil2) are wound around a plate core member (131) in which a central opening (132) is formed.

6. The non-contact charging system according to claim 5, wherein the plate core member (131) is formed in a polygonal shape, a circular shape, or elliptical shape, and is configured such that pieces of amorphous metal or ferrite material are attached thereto.

7. The non-contact charging system according to claim 5, wherein the coils (Pcoil1 and Pcoil2) are wound around the plate core member (131) in series or in parallel.

8. The non-contact charging system according to claim 1, wherein the battery pack (B) comprises:

a secondary core unit (210) configured to induce power through the primary core unit (130); a secondary rectification circuit unit (200) coupled to a coil (Scoil1) of the secondary core unit (120) to rectify the induced power; a charging control unit (230) comprising a charging adjustment circuit (230a) for supplying a fuel gauge (230b) with power rectified by the secondary rectification circuit (200), and applying voltage to a Radio Frequency Identification (RFID) control unit in response to the output of the secondary rectification circuit (200), and the fuel gauge (210b) for supplying a battery BAT through a protection circuit (240) with power supplied from the charging adjustment circuit (230a), and generating charging

state information and periodically records the information while monitoring the charging state of the battery BAT; and a protection circuit unit (240) coupled between the charging control unit (230) and the battery (BAT) to control whether to perform charging or discharging depending on a charged state of the battery (BAT).

9. The non-contact charging system according to claim 8, wherein a shield plate (260) having a film shape is interposed between the secondary core unit (210) of the battery pack (B) and a battery case (250), and the protection circuit unit (240) is surrounded by a shield member (241).

10. The non-contact charging system according to claim 8, wherein the charging control unit (230) is formed by integrating circuits optimized to perform both a charging control function of controlling the charging and discharging of the battery (BAT) using the power rectified by the secondary rectification circuit (200), and a fuel gauge function of generating the charge state information and periodically recording the generated information while monitoring the charging state of the battery (B).

11. The non-contact charging system according to claim 8, wherein the foreign object detection unit (220) detects instantaneous power at the same time that the

batter pack (B) containing the secondary core unit (210) is placed on the wireless charger (A) and allows a no load state to be maintained by maintaining a switch (Q3) in an OFF state for a certain period of time, and allows the no load state to be switched into a load state by maintaining the switch (Q3) in an ON state after the no load state has been maintained for the period of time, thereby informing the primary coil through load modulation that the battery pack (B) containing the secondary core unit (210) has been placed on the non-contact charger (A) and, at the same time, applying power to a charging control unit (230).